

SUPPORT FOR THE AMENDMENTS

The present amendment cancels claims 4 and 5, amends claims 1, 2 and 6-8, and adds new claims 12-14.

Support for the amendment to claim 1 is found at specification page 6, lines 12-15, as well as original claim 5.

Claims 2 and 6-8 have been amended to place these claims in a better condition for allowance. Support for these amendments is provided by the originally filed claims and specification.

Support for newly added claims 12-14 is found at specification page 12, lines 11-25, as well as original claims 1, 5 and 7.

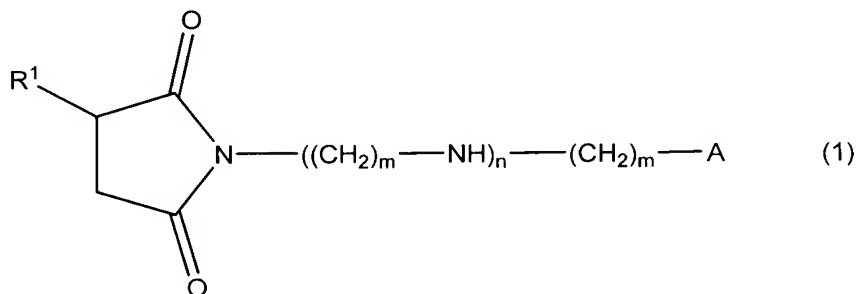
It is believed that these amendments have not resulted in the introduction of new matter.

REMARKS

Claims 1-3 and 6-14 are currently pending in the present application. Claims 4 and 5 have been cancelled, claims 1, 2 and 6-8 have been amended, and new claims 12-14 have been added, by the present amendment.

The rejections of: (1) claims 1-4 and 6-7 under 35 U.S.C. § 102(b) as being anticipated over Meyer (U.S. Patent 4,863,487); (2) claims 1-6 and 8-9 under 35 U.S.C. § 103(a) as being obvious over Goodwine (U.S. Patent 3,405,065); and (3) claims 1-6 and 8-11 under 35 U.S.C. § 103(a) as being obvious over Tipton (U.S. Patent 6,133,210), are respectfully traversed in part, and obviated by amendment in part, with respect to claims 1-3 and 6-14. Claim 1 has been amended to incorporate therein the limitations of now cancelled claim 5. New claim 14 has been added to incorporate therein the limitations of claims 1, 5 and 7.

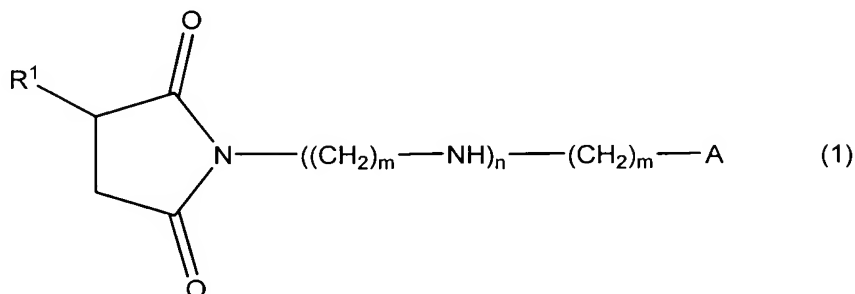
Amended claim 1 recites a lubricant additive comprising a succinimide compound or a boronization product thereof (A), wherein the succinimide compound (A) is represented by the following general formula (1) and is obtained by reacting (a) a succinic acid substituted with an alkenyl or alkyl group having 6-30 carbon atoms or an anhydride thereof with (b) a polyalkylenepolyamine comprising *20-100 mole % of a polyalkylenepolyamine having a ring structure at an end*, based on an entire amount of the polyalkylenepolyamine:



wherein R^1 represents an alkenyl or alkyl group having 6-30 carbon atoms, m represents an integer of 2-4, n represents an integer of 0-3, and A represents the ring structure in the

polyalkylenepolyamine having a ring structure at an end or a mixed structure comprising the ring structure and an amino group.

New claim 14 recites a lubricant additive comprising: (A) a succinimide compound or a boronization product thereof; and (B) *a succinimide compound or a boronization product thereof having a number-average molecular weight of 500-5,000* and is substituted with an alkenyl or alkyl group, wherein the succinimide compound (A) is represented by the following general formula (1) and is obtained by reacting (a) a succinic acid substituted with an alkenyl or alkyl group having 6-30 carbon atoms or an anhydride thereof with (b) a polyalkylenepolyamine comprising *20-100 mole % of a polyalkylenepolyamine having a ring structure at an end*, based on an entire amount of the polyalkylenepolyamine:



wherein R¹ represents an alkenyl or alkyl group having 6-30 carbon atoms, m represents an integer of 2-4, n represents an integer of 0-3, and A represents the ring structure in the polyalkylenepolyamine having a ring structure at an end or a mixed structure comprising the ring structure and an amino group.

As acknowledged on page 3, last two lines of the Official Action, Meyer fails to disclose or suggest a succinimide compound (A) according to the general formula (1), which is obtained by reacting (a) a succinic acid substituted with an alkenyl or alkyl group having 6-30 carbon atoms or an anhydride thereof with (b) a polyalkylenepolyamine comprising *20-100 mole % of a polyalkylenepolyamine having a ring structure at an end*, based on an entire amount of the polyalkylenepolyamine, as presently claimed.

Withdrawal of this ground of rejection is respectfully requested.

As discussed in the present specification, Applicants have discovered that a lubricant composition comprising the lubricant additive of the present invention, which comprises the claimed succinimide compound (A) according to the general formula (1) wherein R¹ represents an alkenyl or alkyl group having 6-30 carbon atoms and A represents a ring structure or a mixed structure comprising the ring structure and an amino group, exhibits an anti-shudder property for a long period of time while maintaining the transmission torque capacity and the friction coefficient between metals (See e.g., page 1, lines 7-18, page 3, lines 6-11 and 19-20, page 4, lines 14-26, page 5, lines 1-4, pages 26-28, Tables 1-3, page 28, lines 22-31, and page 29, lines 1-13).

Unlike the present invention, Goodwine describes a lubricating oil composition comprising an ashless detergent obtained by reacting an alkenylsuccinic acid or an alkenylsuccinic anhydride with an alkylene polyamine (e.g., triethylenetetramine and aminoethylpiperazine), wherein the ashless detergent is useful for improving the detergent characteristics of the lubricating oil composition (See e.g., column 1, lines 61-70, column 2, lines 35-37 and 54-71, column 3, lines 7-25, claims 1 and 3).

Unlike the present invention, Tipton describes a lubricating oil composition comprising an ashless dispersant obtained by reacting a hydrocarbyl substituted succinic acid or anhydride thereof with a polyamine (e.g., tetraethylenepentamine and aminoethylpiperazine), wherein the ashless dispersant is useful for improving the compatibility and homogeneity characteristics of the components within the lubricating oil composition (See e.g., column 1, lines 6-7, column 2, lines 59-63, column 3, lines 39-44, column 4, lines 15-20, column 16, lines 11-19, column 17, lines 34-36 and 44-67, column 18, lines 1-10).

Therefore, Goodwine and Tipton fail to disclose or suggest utilizing a lubricant additive of the present invention, which comprises the claimed succinimide compound (A) according to formula (1) with the specific combination of the alkenyl or alkyl group and the polyalkylenepolyamine having a ring structure, for maintaining the anti-shudder property of a lubricating composition for a long period of time without decreasing the transmission torque capacity and the friction coefficient between metals.

Assuming *arguendo* that sufficient motivation and guidance is considered to have been provided by Goodwine and/or Tipton to direct a skilled artisan to arrive at the lubricant additive of the present invention, which comprises the claimed succinimide compound (A) according to formula (1) with the specific combination of the alkenyl or alkyl group and the polyalkylenepolyamine having a ring structure, which is not the case, such a case of obviousness is rebutted by a showing of superior results.

As shown by the comparative experimental data presented in Tables 1-3 of the present specification, which are reproduced below for the Examiner's convenience, Applicants have discovered that superior properties with respect to maintaining an anti-shudder property for a long period of time without decreasing the transmission torque capacity and the friction coefficient between metals are remarkably exhibited by incorporating the lubricant additive of the present invention, which comprises the claimed succinimide compound (A) according to the general formula (1), into a lubricant composition of Examples 15-28 in accordance with the present invention, as compared to the inferior properties of maintaining an anti-shudder property for only short periods of time and/or decreasing the transmission torque capacity and the friction coefficient between metals exhibited by the traditional lubricant composition of Comparative Examples 3-5, which comprise a conventional polybutenylsuccinimide lubricant additive.

TABLE 1

Example	15	16	17	18	19	20	21
<u>Composition (% by mass)</u>							
100 % base oil	90	90	90	90	90	90	90
metal-based detergent	0.5	0.5	0.5	0.5	0.5	0.5	0.5
antiwear agent	0.5	0.5	0.5	0.5	0.5	0.5	0.5
viscosity index improver	8.5	8.5	8.5	8.5	8.5	8.5	8.5
compound of Example 1	0.5						
compound of Example 2		0.5					
compound of Example 3			0.5				
compound of Example 4				0.5			
compound of Example 5					0.5		
compound of Example 6						0.5	
compound of Example 7							0.5
Life of anti-shudder (hrs)	168	168	168	144	168	168	168
Friction coefficient (µ2)	0.125	0.124	0.123	0.124	0.126	0.125	0.125
Friction coefficient between metals	0.122	0.119	0.119	0.122	0.121	0.121	0.122

TABLE 2

Example	22	23	24	25	26	27	28
<u>Composition (% by mass)</u>							
100 % base oil	90	90	90	90	90	90	90
metal-based detergent	0.5	0.5	0.5	0.5	0.5	0.5	0.5
antiwear agent	0.5	0.5	0.5	0.5	0.5	0.5	0.5
viscosity index improver	8.5	8.5	8.5	8.5	8.5	8.5	8.5
compound of Example 8	0.5						
compound of Example 9		0.5					
compound of Example 10			0.5				
compound of Example 11				0.5			
compound of Example 12					0.5		
compound of Example 13						0.5	
compound of Example 14							0.5
Life of anti-shudder (hrs)	168	168	144	168	168	168	168
Friction coefficient (µ2)	0.124	0.124	0.124	0.126	0.126	0.126	0.126
Friction coefficient between metals	0.121	0.120	0.121	0.123	0.123	0.124	0.124

TABLE 3

Comparative Example	3	4	5
<u>Composition (% by mass)</u>			
100 % base oil	90	90	90
metal-based detergent	0.5	0.5	0.5
antiwear agent	0.5	0.5	0.5
viscosity index improver	8.5	8.5	8.5
compound of Comparative Example 1	0.5		
isostearic acid amide		0.5	
oleic acid monoglyceride			0.5
Life of anti-shudder (hrs)	24	144	48
Friction coefficient (µ2)	0.126	0.105	0.109
Friction coefficient between metals	0.123	0.104	0.108

Withdrawal of these grounds of rejection is respectfully requested.

The obviousness-type double patenting rejection of claims 1-6 and 8-11 as being unpatentable over claims 1-14 of Koshima '191 (U.S. Patent 6,906,191) is respectfully traversed.

Unlike the present invention, Koshima '191 describes a lubricating oil composition comprising an ashless detergent dispersant obtained by reacting a succinic acid or a succinic anhydride substituted with an alkyl or alkenyl group according to formula (I) with a polyalkylenepolyamine, wherein the polyalkylenepolyamine may be a mixture of an acyclic polyalkylenepolyamine (e.g., triethylenetetramine) and a cyclic polyalkylenepolyamine (e.g., aminoethylpiperazine), wherein the ashless detergent dispersant is useful for improving the high temperature detergency and dispersibility characteristics thereof (See e.g., abstract, column 2, lines 24-51, column 3, lines 21-49, column 5, lines 36-49, column 6, lines 32-44, column 7, lines 1-67, column 8, lines 1-19, column 13, lines 1-67, column 14, lines 1-25, Examples 1-6, column 25, lines 58-60, claims 1-14).

Koshima '191 fails to disclose or suggest utilizing a lubricant additive in accordance with the present invention, which comprises the claimed succinimide compound (A) according to formula (1) with the specific combination of the alkenyl or alkyl group and the polyalkylenepolyamine having a ring structure, for maintaining the anti-shudder property of a lubricating composition for a long period of time without decreasing the transmission torque capacity and the friction coefficient between metals.

Assuming *arguendo* that sufficient motivation and guidance is considered to have been provided by Koshima '191 to direct a skilled artisan to arrive at the lubricant additive of the present invention, which comprises the claimed succinimide compound (A) according to formula (1) with the specific combination of the alkenyl or alkyl group and the polyalkylenepolyamine having a ring structure, which is not the case, such a case of obviousness is rebutted by the showing of superior results discussed above.

Withdrawal of this ground of rejection is respectfully requested.

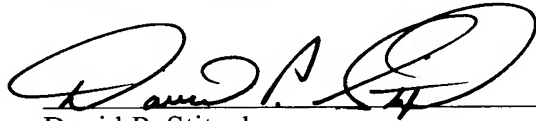
The provisional obviousness-type double patenting rejection of claims 1-6 and 8-9 as being unpatentable over claims 1-9 of copending application 10/515,822 (Koshima '957 US 2005/0181957) is obviated by the enclosed terminal disclaimer disclaiming the terminal portion of any patent issuing from the present application which would extend beyond the full statutory term of any patent issuing from copending U.S. application 10/515,822 and the enclosed certified English translation of foreign priority document JP 2003-178092 perfecting a claim to foreign priority thereby antedating Koshima '957 as a prior art reference.

Withdrawal of this ground of rejection is respectfully requested.

In conclusion, Applicants submit that the present application is now in condition for allowance and notification to this effect is earnestly solicited.

Respectfully submitted,

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